Chiccine, Catherine

From: Knowles, Susan B <SKnowles@ameren.com>
Sent: Wednesday, May 4, 2022 10:15 AM
To: Chiccine, Catherine; Duggan, Timothy
Cc: Joseph Madonia (jmadonia@btlaw.com)
Subject: FW: Ameren's response to City of St. Charles comments on the Huster Conceptual Site Model
Attachments: Ameren Comments_04May2022.docx

All

Attached are responses from Ameren to the City of St Charles' recent comments regarding the Conceptual Site Model.

On a related matter -- Tim, just following up on our discussion regarding the Environmental Covenant. Have you had a chance to discuss this issue with MDNR?

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From: Miller, Barbara J
Sent: Wednesday, May 04, 2022 10:06 AM
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Subject: Ameren's response to City of St. Charles comments on the Huster Conceptual Site Model

Everyone

I have attached Ameren's response to the City of St. Charles comments on the Huster Conceptual Site Model.

Let me know if you have any questions.

Barbara J Miller
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Ameren MO Environmental Services

The past decade has seen a dramatic improvement in environmental conditions at the Huster Substation Site. In fact, USEPA, MDNR and Ameren Missouri ("Ameren") are finalizing an Administrative Order on Consent (AOC) memorializing the remedy design and implementation requirements that will be driven by data that reflects actual conditions at the site – not modelling exercises. Accordingly, many of TwoOneTwo Environmental's (TwoOneTwo) technical comments are ill-placed given the current stage of the remediation project. In addition, TwoOneTwo seems to misconstrue the purpose of the Conceptual Site Model (CSM) approved by USEPA and MDNR. The CSM had a narrowly defined focus, which was to *"evaluate the potential for the City of St. Charles' (City's) municipal groundwater extraction well CW-10 to capture chlorinated volatile organic compounds (CVOCs) related to the Site following a shut-down of the Site Groundwater Extraction and Treatment System (GETS)."* CW-10 was installed circa 2016 and is located approximately 1,300 feet east of the site. In its response letter to USEPA, TwoOneTwo Environmental takes issue with the scope of the CSM and advocates for revisions to that analysis. In so doing, TwoOneTwo has misunderstood and/or mischaracterized key portions of CSM. As requested by USEPA, Ameren provides the following responses to various assertions contained in TwoOneTwo's response letter:

1. TwoOneTwo Environmental Comment

It is our recommendation that the fate and transport model be updated using a conservative hydraulic conductivity for the shallow alluvial deposits (e.g., 22.4 feet per day) or an average of site-specific conductivities generated via hydraulic testing in an appropriate number of monitoring locations screened within the alluvial deposits.

Comment 1 [TwoOneTwo asserts that "shallow alluvial deposits" in the model should be updated to a hydraulic conductivity of 22.4 feet/day]

Ameren Response:
An update to the model is not necessary because the hydraulic conductivity of the uppermost model layer does not affect the results under consideration. Finer grained deposits shallower than 30 feet are included as Layer 1 to create the confined aquifer conditions observed in multiple pump tests (see the "Aquifer Characteristics" section of the CSM). The value of 0.01 ft/day reflects a typical value for fine grained materials. All calculations of groundwater flow pathways and travel times performed and presented are for the productive interval of the aquifer encountered approximately 30-110 feet below ground surface (model layers 2 and 3). This is a conservative assumption as it considers the fastest, most direct flow pathway from the site to the City's wells. Hydraulic conductivities in the productive interval are 300-400 feet/day; an order of magnitude higher than the 22.4 feet/day value referenced by TwoOneTwo. Even if the 22.4 feet/day value were incorrectly assigned to the entire uppermost 30 feet of the model, it would not create a faster or more direct flow pathway. Instead it would remove the confining condition and allow more infiltration of surface water, inconstant with the low storativity observed in the pump tests.

The reason for this misinterpretation is potentially found in the preamble to this comment. On page 2 of their letter, TwoOneTwo states: "There is hydraulic conductivity between the shallow alluvium and deeper coarse-grained units, and these shallow deposits do not represent an "aquiclude" for contaminant migration as modeled." We agree, and this statement is correct. However it is irrelevant as there is no mention in the CSM of an aquiclude in the sense of an obstacle to contaminant migration. Instead, the CSM assumes that there is no natural barrier to CVOCs entering the productive interval of the aquifer. The modeling reflects this as tracers are applied directly to the interval from 30-50 feet below ground surface (model layer 2). The only effect of the low conductivity in model layer 1 / upper

30 feet is to limit infiltration of surface water to be consistent with the low storativity observed in pumping tests.

More broadly, this comment lacks context and supporting data. The location of the borings in the table on Page 2 of TwoOneTwo's document are not identified, except as "three continuously cored borings within the Elm Point Wellfield installed in 2011" with a reference to "Geotechnology, Inc. 2012." As far as we are aware, Geotechnology Inc was the consultant for the former Cadmus property (OU1, OU2 and OU3) portion of the Findett/Hayford Bridge Road Superfund Site and was not involved in installing any of the City of St. Charles ("Elm Point Wellfield") municipal wells. The former Cadmus property is approximately 2,800 feet southwest of the Huster Road site and is close to the bedrock subcrop defining the extreme southern edge of the alluvial aquifer (Figures 1 and 2 in the CSM). If the three boreholes discussed were in the OU1/OU2/OU3 area, they may represent different depositional conditions at the fringes of the aquifer. However, without knowing the location of these borings, it is not possible to evaluate how representative this data is of the regional conditions assessed in the CSM modeling. Likewise, insufficient information is provided regarding the slug test derived value of 22.4 feet/day, as there is no indication of where this test was performed, what specific depth interval was tested, and no justification of why this particular value is reasonably representative of the upper 30 feet of the subsurface.

2. TwoOneTwo Environmental Comment

The measured dissolved phase concentrations for these two chlorinated solvents were nearly an order of magnitude greater than the 1.0 mg/L source concentration used as an input value in the fate and transport model. As a result, the model underestimated the potential concentration of CVOCs migrating towards the production wells under the different pumping scenarios.

Ameren Response:

This is factually incorrect. CVOCs were not explicitly modeled, and the 1 mg/L value does not represent a source zone concentration. The fate and transport model considered the transport time and dilution of a passive tracer. Note that the ordinate axis of the time series plots are all labeled *"fraction of concentration at origin."* This fraction is the modeled concentration in the well divided by the modeled concentration in the source zone, which provides an estimate of dilution. We used a unit concentration of 1 mg/L for numerical convenience. Changing this value will not change the fractional results observed in the well. Because these time series represent a ratio, they can be used by the reader to estimate the dilution of any theoretical source zone concentration. The discussion on pages 7-9 of the CSM describes an example of how this can be done.

The reason for this misinterpretation is unclear, as this is discussed repeatedly in the CSM text. For example, Page 7, Paragraph 2:

"Here these attenuation mechanisms are quantified using a MT3D model based on the Modflow results for each scenario. A constant concentration source of a passive (non-reactive) tracer is applied at a unit concentration in an area beneath the Site to simulate a hypothetical release of new CVOCs into the aquifer following shut-down of the GETS wells. This is a conservative approximation, as in reality, this release would be a mixture of cis-1,2-DCE and Vinyl Chloride which will experience more attenuation than the passive tracer due to sorption to aquifer solids and continued bio-degradation."

3. TwoOneTwo Environmental Comment

The CSM identified that the majority of the remaining mass in the source zone is present in the shallow clay and silt alluvium beneath the substation. However, groundwater monitoring wells MW-8 and MW-13 were constructed with screen intervals below the contact

Ameren Response:
Ameren concurs with USEPA's response.

4. TwoOneTwo Environmental Comment

Monitoring locations within OU-4, including wells MW-8 and MW-13, have been utilized for in-situ remedial activities including injection of sodium permanganate, as well as introduction of bioremediation amendments.

Ameren Response: This statement is inaccurate. MW-8 and MW-13 have never been used for the injection of sodium permanganate. Rather, during the final pilot study, Ameren injected sodium permanganate into the soil which eventually made its way to groundwater near MW-8 and discovered during quarterly sampling. There has been no evidence of sodium permanganate at the Site for more than 12 months.

However, MW-8 has been used for the feeding of the bio-mass to keep the bio-mass healthy. USEPA and MDNR were informed that feeding was necessary, especially after the sodium permanganate had dissipated from the well.

5. TwoOneTwo Environmental Comment

It is anticipated that the concentration of CVOCs beneath the substation are considerably higher than those utilized within the fate and transport model.

Ameren Response:
TwoOneTwo has provided no data to support this contention and groundwater monitoring continues to reflect steady progress and the reduction of contaminants at the Site. Decisions regarding remedial design and remedial actions are – and will continue to be – driven by actual data. More importantly, CVOCs were not explicitly modeled, and the 1 mg/L value **does not** represent a source zone concentration. The fate and transport model considered the transport time and dilution of a passive tracer. This fraction is the modeled concentration in the well divided by the modeled concentration in the source zone, which provides an estimate of dilution. A unit concentration of 1 mg/L for numerical convenience. Changing this value will not change the fractional results observed in the well. Pages 7-9 of the CSM discusses how these results can be related to a hypothetical source zone concentration.

6. TwoOneTwo Environmental Comment

However, only two of the five modeled scenarios resembled the groundwater extraction rates reported during monthly operation in 2020 within the production wells.

Ameren Response:
The modeled scenarios were agreed upon and approved by USEPA and MDNR following review of the draft CSM document in October 2021. TwoOneTwo is correct that only two of the scenarios were intended to represent reported rates. The other three scenarios represent end member cases that were added upon the request of EPA and MDNR to examine the possibility of more extreme, unanticipated future scenarios (i.e., Scenario #s: 3, 4, 5). Such scenarios assumed a variety of operating scenarios during which various city wells were turned "on and off" to simulate a myriad of pumping rates and

directional flow. None of those additional scenarios represented actual City operations (i.e., CW 9 offline; CWs 6-9 removed from service etc.).

7. TwoOneTwo Environmental Comment

The modeled groundwater extraction rates from production well CW-8 were consistently lower than the actual rates reported for this well within each of the five modeled scenarios.

Ameren Response. The model used pumping rates based on the actual monthly rate data for 2020 reported by the City of St Charles. Please see Table 1 in the CSM report. (Note: USEPA summarized partial data for 2020, the complete reported values are contained in Table 1.) The pumping rates used in the model are both accurate and representative of the well field's operating regime and are sufficient for the purposes of the CSM.

8. TwoOneTwo Environmental Comment

CVOCs have been measured in groundwater samples collected from production wells CW-8 and CW-10 above the USEPA Tap Water Regional Screening Levels (RSLs) within the past three years.

Ameren Response: The accuracy of this statement cannot be verified as TwoOneTwo has not provided Ameren with any data reflecting the presence of CVOCs in either CW 8 or 10. Furthermore, CW-8 is upgradient of the Site and it is highly unlikely that any contaminants from the Site could reach CW-8 as onsite MWs 9, 14 and 1 reflect no impact.

Ameren concurs with USEPA and MDNR comments that remedial actions should be based on maximum contaminant levels (MCLs) and not regional screening levels.

9. TwoOneTwo Environmental Comment

Most recently, operation of production well CW-6 was suspended by the City of St. Charles due to CVOCs detected within routine groundwater samples collected by Ameren in December 2021.

Ameren Response: This comment is unrelated to the CSM. The CSM analyzed potential offsite impacts to CW-10 located west and down gradient of the substation once groundwater extraction via the GETs terminates, and not water quality north of Highway 370 in the vicinity of CW-6. As USEPA notes, sampling at CW-6 fully complies with public drinking water standards. In addition, recent sampling of PZ-11, located 109' (according to the City) from CW-6, reflects cis-DCE and VC values of <0.2 ug/L and <0.1 ug/L respectively, 99 % decrease since the December 2021 referenced by TwoOneTwo. Additional groundwater investigation efforts in this area are planned, if the December 2021 detected levels re-appear.

10. TwoOneTwo Environmental Comment

It is important to note that the GETS was operating at the substation property when CVOCs were detected in groundwater samples collected from production wells CW-6, CW-8, and CW-10.

Ameren Response: Ameren has not been provided any documentation to substantiate the detections in groundwater samples collected from the production wells of CW-8 or CW-10. See above response regarding CW-6.